

00 P2 A3	<b>2C, 3B</b> <ul style="list-style-type: none"> <li>•<sup>1</sup> <math>f\left(\frac{3}{x}\right)</math></li> <li>•<sup>2</sup> <math>3 - \frac{3}{x}</math></li> <li>•<sup>3</sup> <math>p\left(\frac{3}{3-x}\right)</math></li> <li>•<sup>4</sup> <math>3 - \frac{3}{\frac{3}{3-x}}</math></li> <li>•<sup>5</sup> <math>x</math></li> </ul> <ul style="list-style-type: none"> <li>• They are inverses of each other</li> </ul>
2.(JAN) 02 P1	<b>3C, 1B</b> <ul style="list-style-type: none"> <li>•<sup>1</sup> <math>f\left(\frac{3}{x+1}\right)</math></li> <li>•<sup>2</sup> <math>\frac{3}{\frac{3}{x+1} + 1}</math></li> <li>•<sup>3</sup> <math>\frac{3x+3}{x+4}</math></li> <li>•<sup>4</sup> <math>x \neq -4</math></li> </ul>
03 P1	<b>2C, 1B</b> <ul style="list-style-type: none"> <li>•<sup>1</sup> <math>f(2x+3)</math></li> <li>•<sup>2</sup> <math>\frac{1}{2x+3-4}</math>      ans : <math>\frac{1}{2x-1}</math></li> <li>•<sup>3</sup> <math>x \neq \frac{1}{2}</math></li> </ul>
05 P1	<b>2C, 2C</b> <ul style="list-style-type: none"> <li>•<sup>1</sup> <math>g(3x-1)</math></li> <li>•<sup>2</sup> <math>(3x-1)^2 + 7</math></li> <li>•<sup>3</sup> <math>\left(\frac{1}{3}, 7\right)</math></li> <li>•<sup>4</sup> <math>y \geq 7</math></li> </ul>
06 P1	<b>3C, 2C</b> <div style="display: flex; justify-content: space-between;"> <div> <ul style="list-style-type: none"> <li>•<sup>1</sup> <math>f(g(x)) = f(2x-3)</math></li> <li>•<sup>2</sup> <math>2(2x-3) + 3</math></li> <li>•<sup>3</sup> <math>g(f(x)) = 2(2x+3) - 3</math></li> <li>•<sup>4</sup> <math>16x^2 - 9</math></li> <li>•<sup>5</sup> min.value = -9</li> </ul> </div> <div> <p>stated or implied</p> <p>stated explicitly</p> </div> <div> <ul style="list-style-type: none"> <li>•<sup>1</sup> <math>g(f(x)) = g(2x+3)</math></li> <li>•<sup>2</sup> <math>2(2x+3) - 3</math></li> <li>•<sup>3</sup> <math>f(g(x)) = 2(2x-3) + 3</math></li> </ul> </div> </div> <p style="text-align: center; margin-top: 10px;"><b>OR</b></p>
07 P1	<b>2C, 2C</b>

	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>g(f(x)) = g(x^2 + 1)</math></li> <li>•<sup>2</sup> <math>1 - 2(x^2 + 1)</math></li> <li>•<sup>3</sup> <math>g(g(x)) = g(1 - 2x)</math></li> <li>•<sup>4</sup> <math>1 - 2(1 - 2x)</math></li> </ul>
	<div> <div> let <math>y = 6 - 2x</math> and rearrange.   state expression.   <b>Method 2</b>   equates composite function to <math>x</math>   start to rearrange.   state expression.   state expression </div> <div> <ul style="list-style-type: none"> <li>•<sup>1</sup> <math>x = \frac{6-y}{2}</math> or <math>y = \frac{6-x}{2}</math></li> <li>•<sup>2</sup> <math>g^{-1}(x) = \frac{6-x}{2}</math> or <math>3 - \frac{x}{2}</math> or <math>\frac{x-6}{-2}</math></li> </ul> <b>Method 2</b>   <math>g(g^{-1}(x)) = x</math> this gains •<sup>3</sup>   <math>6 - 2g^{-1}(x) = x</math>   <math>g^{-1}(x) = \frac{6-x}{2}</math> or <math>3 - \frac{x}{2}</math> or <math>\frac{x-6}{-2}</math>   •<sup>3</sup> <math>x</math> </div> </div>

### ANSWERS PRE 2000 Composite Functions

1	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>p = 1</math></li> <li>•<sup>2</sup> <math>r = 46</math></li> <li>•<sup>3</sup> <math>h(x) = g(f(x))</math></li> <li>•<sup>4</sup> <math>h(x) = (2x + 5)^2 - 3</math></li> </ul>
2	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>f\left(\frac{x}{1-x}\right)</math></li> <li>•<sup>2</sup> <math>\frac{\frac{x}{1-x}}{1 - \frac{x}{1-x}}</math></li> <li>•<sup>3</sup> <math>\frac{x}{1-2x}</math></li> </ul>
3	2C, 2C <ul style="list-style-type: none"> <li>•<sup>1</sup> <math>g(f(x)) = g(x^2 + 1)</math></li> <li>•<sup>2</sup> <math>1 - 2(x^2 + 1)</math></li> <li>•<sup>3</sup> <math>g(g(x)) = g(1 - 2x)</math></li> <li>•<sup>4</sup> <math>1 - 2(1 - 2x)</math></li> </ul>
4	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>f(\sin x + \cos x)</math></li> <li>•<sup>2</sup> <math>2(\sin x + \cos x)</math></li> <li>•<sup>3</sup> <math>g(2x)</math></li> <li>•<sup>4</sup> <math>\sin 2x + \cos 2x</math></li> </ul>
5	<div> <div> <ul style="list-style-type: none"> <li>•<sup>1</sup> <math>f(x^2 + 2)</math></li> <li>•<sup>2</sup> <math>(x^2 + 2)^2 - 1</math></li> </ul> </div> <div> <ul style="list-style-type: none"> <li>•<sup>3</sup> <math>((x^2 + 2) + 1)((x^2 + 2) - 1)</math></li> <li>•<sup>4</sup> <math>(x^2 + 3)(x^2 + 1)</math></li> </ul> </div> <div> OR  <ul style="list-style-type: none"> <li>•<sup>3</sup> <math>x^4 + 4x^2 + 3</math></li> <li>•<sup>4</sup> <math>(x^2 + 3)(x^2 + 1)</math></li> </ul> </div> </div>

6	<p>(a)</p> <ul style="list-style-type: none"> <li>•<sup>1</sup> <math>f(x+1) = 4(x+1)^2 - 3(x+1) + 5</math></li> <li>•<sup>2</sup> <math>4x^2 + 8x + 4 - 3x - 3 + 5</math></li> <li>•<sup>3</sup> <math>f(x-1) = 4(x-1)^2 - 3(x-1) + 5</math></li> <li>•<sup>4</sup> <math>f(x-1) = 4x^2 - 11x + 12</math></li> <li>•<sup>5</sup> <math>\frac{16x-6}{2}</math></li> </ul> <p>(b)</p> <ul style="list-style-type: none"> <li>•<sup>6</sup> <math>g(x+1) = 2(x+1)^2 + 7(x+1)</math> and <math>g(x-1) = 2(x-1)^2 + 7(x-1) - 8</math></li> <li>•<sup>7</sup> <math>g(x+1) = 2x^2 + 11x + 1</math></li> <li>•<sup>8</sup> <math>g(x-1) = 2x^2 + 3x - 13</math></li> <li>•<sup>9</sup> <math>4x + 7</math></li> </ul> <p>(c)</p> <ul style="list-style-type: none"> <li>•<sup>10</sup> strategy stated or implied</li> <li>•<sup>11</sup> <math>6x + 5</math></li> </ul>
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### ANSWERS PRE 2000 Functions - Domains

1	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>g\left(\frac{1}{x^2-4}\right)</math></li> <li>•<sup>2</sup> <math>2\left(\frac{1}{x^2-4}\right) + 1</math></li> <li>•<sup>3</sup> <math>\frac{x^2-2}{x^2-4}</math></li> <li>•<sup>4</sup> "any domain which excludes 2"</li> </ul>
2	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>g(2x+3)</math></li> <li>•<sup>2</sup> <math>\frac{(2x+3)^2+25}{(2x+3)^2-25}</math></li> <li>•<sup>3</sup> <math>(2x+3)^2 - 25 = 0</math></li> <li>•<sup>4</sup> <math>x = 1, -4</math></li> </ul>

### ANSWERS PRE 2000 Inverse Functions

1	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>f\left(\frac{1}{x}-2\right)</math></li> <li>•<sup>2</sup> <math>\frac{1}{\frac{1}{x}-2+2}</math></li> <li>•<sup>3</sup> <math>x</math></li> <li>• They are inverses of each other</li> </ul>
2	<ul style="list-style-type: none"> <li>•<sup>1</sup> <math>f(3-2x)</math></li> <li>•<sup>2</sup> <math>5-4x</math></li> <li>•<sup>3</sup> <math>h(5-4x)</math></li> <li>•<sup>4</sup> <math>x</math></li> <li>•<sup>5</sup> inverse of each other</li> </ul>